Available online at www.sciencedirect.com

ScienceDirect

Procedia Economics and Finance 26 (2015) 160 – 166

Procedia Economics and Finance

www.elsevier.com/locate/procedia

4th World Conference on Business, Economics and Management, WCBEM

Future of Logistics Management in the Process of Globalization

Pavel Ceniga[a]*, Viera Sukalova[b]

[a]*University of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics, Univerzitna 8215/1, 010 26 Zilina, Slovakia*

[a]*University of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics, Univerzitna 8215/1, 010 26 Zilina, Slovakia*

Abstract

The paper deals with ecological future development trends and highlights the interest of the business professionals and partners on sustainability in logistics management, assuming that economic needs, customer requirements and regulatory measures will also drive towards sustainability. Sustainable development of logistics in the coming years will most likely formed by seven key developments. Required forecasts contained in this article are based on the assumption that the current trend towards sustainability will continue and logistics service providers will seek to incorporate principles of sustainability into their business models and transactions.

Peer-review under responsibility of Academic World Research and Education Center

Keywords: Logistics Management; Sustainable Approach; Globalization; Green Logistics;

1. Introduction

In today's complex societies, sustainability relates to the actions of individuals or stakeholder groups in dynamic political, social or ecological systems. Such systems are characterized by a large number of influencing factors, which often do not show linear behaviour. As a result, there are extreme states in these systems, accompanied by strong system destabilization and high risk. A simple example that demonstrates this phenomenon is road traffic: at a certain traffic density, rather than a proportional slowdown of traffic, the extreme state of congestion and standstill occurs. The concept of a sustainability-oriented society is not only characterized by the quest for prosperity, progress and social participation by all, without detrimentally exploiting natural resources. According to Gourdin

* doc. Ing. Pavel Ceniga, PhD., Tel.: +421-41-5133-218.
E-mail address: pavel.ceniga@fpedas.uniza.sk

Peer-review under responsibility of Academic World Research and Education Center
doi:10.1016/S2212-5671(15)00908-9

(2006), it is also a society that neither creates nor knowingly accepts risks that threaten its existence or that of future generations. The logistics industry already started to take sustainability into account some years ago. This shift was further reinforced by additional trends impacting the main stakeholder groups. These include an increasing awareness of environmental issues within society, resulting in greater demand for green, the rising importance of economic drivers of sustainability, as well as growing political action and regulation in this direction. While the world is still struggling to agree on concerted action and on a comprehensive approach to combat climate change globally, numerous regulatory measures aiming to limit the carbon emissions of transport, have been and are being implemented around the world. Regulation has become an important factor and will remain a crucial driver for promoting a greener logistics industry (Pernica, 2004).

2. The role of Logistics in the Economy, Organization in the process of Globalisation

In the highly interconnected world in which we live, where the next shopping bargain or international business opportunity may be just a few clicks away, the transport and logistics sector plays an increasingly important role. Logistics and transportation companies not only facilitate the sourcing of raw materials and supplies, they are also crucial when it comes to assembling and warehousing products, and in getting the finished goods to market. Logistics connects people and markets through a physical network that is just as important as the virtual network of the internet. It makes the global distribution of the latest "must have" gadget possible within a precise time window, as well as enabling the specialized transport of life-saving vaccines and medicines to field hospitals in remote locations. Logistics is a key driver of economic growth, wealth creation and jobs. In terms of its direct contribution to the economy, logistics and express services account for around 9 % of global GDP. In the European Union alone, the logistics sector generated revenues of € 1 trillion in 2009, or around 10 % of European GDP. At the same time, the transport and logistics sector creates growing employment opportunities worldwide. In Germany, for example, around 2.6 million people are employed in the logistics industry (around 7 % of the national workforce) (Ballou, 2006).

Kille and Schwemmer (2014) describe, that the logistics sector has been shaped in recent years by the spread of globalisation. As a result of this development, the average length of transport distances has been growing longer and longer. In addition, logistics companies have been forced to follow customers who have employed offshoring strategies - that is, the relocation of production to far-off low-wage countries. In this process, the necessary route potential must be created. In addition, strategic, operational and legal issues are becoming increasingly complex. Actions like the European Union's enlargement to the east are adding fuel to this development. Particularly in the transport sector, longer transport distances and times are being created. In Eastern Europe, the sometimes poor infrastructure and service culture pose their own special challenges for transport companies - e.g., in the form of difficult customs clearing. The overall risk associated with a transport is growing. The changed geographic market structures are also forcing logistics-service providers to rethink their network strategies. Today, relocations from major logistics and transhipping centres in the Benelux countries to destinations in the east are already being undertaken. As globalization spreads and competitive pressure grows with it, companies will also face demanding business-related requirements. According to Kliestik (2013) flexibility and the ability to respond promptly and flexibility to changes become a huge competitive asset. Only those companies that are able to fulfil given requirements have a chance to survive. They will have to avoid empty runs, to design schedules as efficiently as possible and to minimize transhipping frequency and times as well as personnel costs and damage to goods. All operational planning must be optimized, inventories reduced and administrative costs cut as much as possible. Amid all of this, the needs of customers must always be met - e.g., in terms of on-time service, delivery reliability, degree of service, low pricing, short order-processing times, flexibility, availability, capacity utilization and productivity. In recent years, the share of empty runs in long-distance shipping has been lowered by about 10 percent. Furthermore, concerns about the environment have been growing for years now - and, in the process, an increasing aversion to environmentally damaging road transports has emerged. As a result, somewhat forgotten means of transport like inland waterway shipments are becoming increasingly attractive.

2.1 The Importance of a Sustainable Approach

Having contributed significantly to economic growth, increased employment and the creation of a global marketplace, according to Erhart et al. (2010), the logistics sector must now equally understand its responsibility for

the environmental impact of worldwide trade and transport, especially for the sector's contribution to climate change. Just as logistics contributes to economic prosperity around the globe, it now needs to help bring about an ecologically sustainable, low-carbon economy. A business-as-usual scenario is not an option. The economic consequences of climate change, with an estimated cost of around 5 % – 20 % of global GDP, have been clearly described by Stern (2007), while the social consequences of the imminent flooding of entire island nations needs no elaboration. This climate change scenario does not even include the fact that the production of the key natural resource currently required for most transportation – oil – will decline dramatically. The way forward begins by recognizing that the logistics industry is a major source of CO2 emissions. According to the Intergovernmental Panel on Climate Change (IPCC - 2007), transport, including freight and personal transport, accounts for 13.1 % of global greenhouse gas (GHG) emissions. The World Economic Forum (2009) calculates that the logistics industry is responsible for around 2.8 m metric tons of GHG emissions per year, which is around 5.5 % of global GHG emissions. Road freight accounts for roughly 60 % of total emissions from the logistics and transport sector, with over 1,500 megatons of CO2-equivalent emissions. Assessed in emissions per ton kilometre, air freight today is still the most carbon-intensive transportation mode, even if new generation aircraft are expected to burn up to 20 % less fuel. The most carbon-efficient transportation modes of motorized transport are rail and ocean.

2.2 Low-Carbon Logistics Solution

While the need for the logistics sector to respond to the challenge of climate change is clear, low-carbon logistics solutions and flexible transport modes are not yet widely available. The option of switching the transport of goods from a more carbon intensive transport mode to rail, for instance, depends on the railway infrastructure being in place. Improving the efficiency of transport modes also presents a challenge. There are only a few market- ready technologies and solutions today that can meet the specific needs of the transport and logistics sector. This is especially true for air freight and long-distance road transport, where there is currently a lack of alternative technologies and fuels. Finally, sustainability also seems to be a cultural issue: today, many still see a contradiction between economic growth and environmental protection, rather than realizing how they might go hand-in-hand. Companies or individuals who already act in an environmentally aware or sustainable way are still considered by some to be "tree huggers." At the same time, although combating climate change has become a key topic of public discourse and media coverage, governments still have a hard time reaching global political agreements on reducing greenhouse gas emissions. As already demonstrated by many companies and organizations today, sustainability can be a trend-setting business model, opening up new market opportunities and preparing for future scenarios. It can also help to cut costs thanks to the introduction of more efficient processes and reduced inputs of natural resources. No single company can come up with all the answers by itself. That's why it is important that organizations such as the World Business Council for Sustainable Development (WBCSD) or the UN Global Compact bring together companies from all regions and industries committed to doing business in a more sustainable way. In fact, the first indices that rank companies based on sustainability-related criteria, such as the Dow Jones Sustainability Index, are already being used by investors. These indices and rankings not only encourage companies to change their approach to business, but they also provide a level of transparency that was previously missing. (Cornillie and Macharis, 2005).

2.3 New Trends and Developments in Business

According to Gourdin (2006) there are many trends and developments indicating that, for most companies, long-term success will be strongly linked to more sustainable business concepts. The following are some of the trends and developments that are likely to shape businesses by 2020:

- **Customers** will place sustainability factors higher on their strategic agendas, creating demand for and incentivizing the production of sustainable products and services. One key driver will be the need to measure and reduce his own carbon footprint.
- **Investors** will expect companies to adopt more sustainable business models, such as producing goods and services with fewer natural resources, or by demonstrating how they intend to manage the risk of future environmental and social regulations. Expectations of how a company reports on its sustainability-related performance, as well as the frequency of reporting, will also increase.
- **Employees** will be encouraged to transfer their sustainable behaviours from the home to the workplace. A

company's sustainability-related performance will become even more important in recruiting and retaining employees.

• **Political leaders** will support increasingly stricter sustain- ability legislation (e.g., carbon accounting, biofuels, cross border/ entry regulations that help avoid empty trucks, air traffic control restructuring), and foster alternative Technologies (e. g., solar panels, electric vehicles).

• **Industry alliances** will be organized to set standards (e.g., the Clean Cargo Working Group), and promote new ways of thinking (e.g., subcontractor management, and the issue of companies being both customers and subcontractors to each other). Although some of these elements may sound visionary, the transport and logistics sector has already started to change its trends towards a more sustainable approach. The transformation to a greener business is right on our doorstep.

3. Results - Key developments of global Logistics Environment towards sustainability

3.1. Logistics services - strategic importance in the move towards a low-carbon economy.

Today, logistics services are mainly viewed as a commodity where price rules. Grant (2013) suppose, that this will change as customers, policymakers, and companies begin to realize that logistics services and expertise are the key elements to providing sustainable solutions. Within the push and pull of customer demands and regulatory measures on the one side, and innovative improvements on the other, logistics will become an industry where comprehensive expertise and service quality dominate over the simple question of pricing. As economic and environmental issues become increasingly entwined, this will also shift logistics companies away from being providers of a commodity to becoming competent consulting partners that help "decarbonize" supply chains and distribution processes. The leading logistics companies will be those that possess the unique selling proposition and differentiator of providing these sustainable services; those that compete on the playing field of expertise rather than just offering the cheapest solution. Efficient supply chains have long been considered key for a company's economic success, but as market and regulatory demand for greener products rise, efficient, environmentally-friendly supply chains will increasingly be sought. Logistics' unique role as a network industry, connecting businesses from all sectors and from all regions, makes it predestined to address the problems of CO2 emissions all along the supply chain. The development towards logistics as a sustainability enhancer will not only come from providers rethinking their offering. Companies will radically adjust their view about their own logistics processes and come to see them as strategic levers that can noticeably influence their market position. This is increasingly the case. Within the *Green Trends Survey*, business customers already anticipate that, in future, logistics processes and actions will be aligned with the goal of reducing carbon emissions. These improvements in companies' supply chains will not only reduce their carbon footprint; they will, at the same time, help to reduce cost, increase quality and leverage new market opportunities. If companies consider their supply chain a key element of their business strategy, they will also become much more aware of potential improvements – in terms of cost savings, increased reliability, and CO2 reductions, that greening their supply chain can bring.

3.2 Technological Changes – New Concerted Drive from Companies, Governments and Financial Institutions

While all actors, both political and commercial, understand that technology can provide important sustainable solutions, financial constraints and longer payback periods still hamper investments. This is true not only for new and innovative technologies, but also existing ones as well. As few companies will be willing to carry these costs alone, business, policymakers and financial institutions will have to work together to promote investments. This change will be ushered in by rethinking on many levels. Companies need to accept slightly longer payback periods; policymakers need to put incentives like tax breaks and green procurement obligations in place to reward companies who make carbon reduction a priority. And, financial institutions can support sustainable business practices, too, for instance by developing innovative loans to allow for energy efficiency measures. Within companies, this will include a change in investment policies. Increasingly, companies will allow for longer pay-off periods for energy-saving measures.

Lemoine and Dagnaes (2003) present, that sustainability will become an important factor calculated into any investment decision. Incorporating carbon efficiency targets in the annual assessment of managers is yet another method companies will use to promote sustainability. With incentives and proper funding, research and development

in new technologies or solutions will also increase. Financial institutions will play a twofold role in supporting companies. In particular, innovative funding instruments will be established for large-scale efficiency programs. The sector will also create sustainability assessments and ratings, and design sustainable financial products. Some of this is already happening. "Responsible investment" funds – in many ways the sustainable product of the financial sector – reward companies for their sustainability and are growing in popularity. Government policy, either by offering low-interest loans or through direct subsidies, will promote the development and use the technologies and concepts until these have reached mass-market stage. An example of this is the support already given to hybrid, electric or other low-emission vehicles in many countries. These incentives must be managed carefully, though. Otherwise, guaranteed long-term financial support can hinder technological progress and breakthroughs.

3.3 Collaboration along the Supply Chain - Enabler to Attain Sustainability

The move towards sustainable logistics will bring about an increased level of cooperation among all actors in society, business and government, as they set up standards, agree on price tags and support binding regulations. But business models will change as well, as companies discover that sustainability calls for more collaborative approaches. Malindzak et al, (2010) review the vertical cooperation long the supply chain between customers, suppliers and service providers is already common throughout many sectors, but horizontal cooperation between companies – some of which might even be competitors – also holds great carbon reduction potential. For example, multi-user warehousing and consolidated shipments are ways not only to reduce excess capacity and save money, but they also lower emissions. One precondition to ensure the development of such collaborative approaches is compliance with competition rules in order to ensure legal certainty of those new business models. At the moment, though, many companies are still cautious about collaborating too closely and are wary of sharing know-how and putting sensitive information at risk. Still, the majority of business customers already strongly agree that horizontal collaboration to reduce CO2 emissions will significantly increase in the next ten years.

3.4 New Business Models of Logistics Companies - Sustainable Innovations

Electric vehicles will probably have the largest impact on the logistics industry, with low-noise night deliveries becoming common practice. Vast fleets of these vehicles could also become a part of "smart grids," with their batteries being charged during periods of low demand (or high supply). Hooked to the grid, their batteries might become a source of energy for others during times of high demand – thus making logistics companies not only consumers, but also managers of energy. The ongoing dematerialization trend – the digital distribution of documents, books and other media – offers many opportunities to save carbon emissions, as well. While this has initially put logistics providers, especially mail carriers, under pressure, it will also provide for new business opportunities. Hybrid mail services allow what was once delivered as a letter to be sent digitally to distribution centres near points of delivery, where it is printed and delivered to the final destination. Even e-mail is being embraced by postal services, which are now increasingly offering a secure version that is as binding as a letter.

3.5 Standardization CO2 Labeling – Way to Transparency Business Operations in Supply Chain

Grant et al., (2006) suppose that consumers have the power to enforce change through their buying decisions. But they will also demand more transparency, especially when paying a premium for sustainable solutions. Manufacturers will therefore put great effort into establishing comprehensive carbon accounting, controlling and management systems. Logistics companies will use their expertise and knowledge of processes to collect this data, thus supporting efforts to develop standardized CO2 labeling in a format that is easily understood, transparent and simple to compare. Currently, this transparency is provided mostly for green products within companies. But logistics companies will recognize that they have a common interest in working together, along with governments, to develop standards and labels that are accepted by all. Governments will support this overall development by promoting international standards that provide transparency regarding CO2 emissions.

3.6 Carbon Emissions - part of a business' accounting and decision-making process.

Transparency provided by labeling and standards is only the first step. An important incentive to make businesses

and logistics more sustainable will come with carbon emissions becoming just as much a factor in a company's accounting and decision-making process as costs for procurement or personnel. To reduce risk and support their planning, companies will demand that costs incurred by carbon emissions be calculable – thus calling forth the need for emission price tags. One of the ways governments will facilitate this is by introducing a carbon-pricing framework. Two instruments appear to be most likely: cap-and-trade or taxes systems. Both have their merits. Cap-and-trade sets a specific reduction target while allowing for some flexibility in how that is reached. For example, in the mid- to long-term, carbon credits could become a tradable currency – like the euro or U. S. dollar. One of the world's largest emissions trading schemes is already in place: the European Union Emissions Trading System (EU ETS). Starting in January 2012, aviation will be the first transport-related industry to be included in the EU ETS. But cap-and-trade systems will also have a downside. Carbon emissions become a commodity with fluctuating value, thus increasing financial uncertainty. A second instrument of the governments will draw on are taxes levied on the burning of fossil fuels to discourage their use, and encourage alternative energy sources. Many countries already use taxes on fossil fuels to support their environmental policies. The challenge for governments will be to set taxes at such a level that they do not hinder growth, but are high enough to change behaviour and have a noticeable positive effect on sustainability. (Erhart et al., 2010).

3.7 Carbon Pricing - Regulatory Measures of Companies

A major challenge for the success of these measures is providing for a level playing field. Common standards and rules, in according to Grant (2013), that apply to all actors in the business, will therefore need to be introduced. At the start, the industry will see a drive to implement accurate but feasible standards for CO2 accounting and reporting across the sector. Besides enabling the customer to compare products and services, this will ensure that, when future regulatory measures are passed, companies, logistics providers and governments will still be speaking the same language and using the same sort of data. Common standards, though important, are but a step in the right direction, however, and will not be enough. Universal rules that cover all actors in one market will also need to be introduced. Especially when it comes to political measures, like cap-and-trade systems or regulations, a global scope is always preferable for a global industry like logistics; nevertheless, even a regional scope, such as at European level, can sometimes be sufficient. Because of the difficulty of getting a large number of diverse countries and organizations to agree, it is likely that, in the near future, binding regional regulations will be more common than global ones. A patchwork of policy measures at the national level, however, is not advisable. It could lead to a regulatory race to the bottom and encourage "carbon leakage" – the relocation of carbon intensive industries to countries with lax regulation.

4. Discussion

The paper attempts to apply that Logistics is the integrated management of all the activities required to move products through the supply chain. For a typical product this supply chain extends from a raw material source through the production and distribution system to the point of consumption and the associated reverse logistics. The logistical activities comprise freight transport, storage, inventory management, materials handling and all the related information processing. The main objective of logistics is to co-ordinate these activities in a way that meets customer requirements at minimum cost. In the past this cost has been defined in purely monetary terms. As concern for the environment rises, companies must take more account of the external costs of logistics associated mainly with climate change, air pollution, noise, vibration and accidents. This article is examining way of reducing these externalities and achieving a more sustainable balance between economic, environmental and social objectives.

5. Conclusion

Significant carbon reduction results can already be achieved today. This is not only true for sourcing and manufacturing strategies, but even more so for goods distribution. Optimizing the design of a distribution network, using the right modes of transportation and efficiently managing load capacity and routes can all be very effective instruments to cut carbon emissions as well as costs. Furthermore, implementing a comprehensive set of city logistics solutions can also lead to carbon savings while, at the same time, improving the quality of life in cities. Change will happen and, while there is no blueprint for "lowcarbon logistics" that can be implemented everywhere,

regardless of local circumstances, the spectrum of available technologies and solutions is well-known. The same is true for the important stakeholders and other factors influencing the future development of the sector. It is very important to connect both strands in order to outline the changing face of a logistics industry to become more and more sustainable.

In addition, an overwhelming majority of transport/ logistics customers agree with the proposition that there should be clear standards for the offsetting of transport-related carbon emissions, as well as an evaluation by independent organizations. This certainly is an area where political support could make a difference and contribute to the development of greener transport. On a similar note, a clear majority of end consumers said they would, in future, pay attention to carbon footprint measures such as package labels indicating the CO2 emissions.

Acknowledgements

This paper is prepared with the support of the project "Education quality and human resources development as the pillars of a knowledge society at the Faculty PEDAS, University of Zilina in Zilina“, ITMS project code 26110230083, University of Zilina. Modern knowledge society education / Project is co-financed by the EC funds. (Prispevok vznikol v nadväznosti na rieseny projekt spolufinancovany zo zdrojov EU s nazvom „Kvalita vzdelavania a rozvoj ľudskych zdrojov ako piliere vedomostnej spolocnosti na Fakulte PEDAS Zilinskej univerzity v Ziline“, ITMS kód projektu 26110230083“, rieseneho na Zilinskej univerzite v Ziline. Moderne vzdelavanie pre vedomostnu spolocnosť/Projekt je spolufinancovany zo zdrojov EU)

References

Ballou, R.,H., (2006). Revenue Estimation for Logistics Customer Service Offerings. *The International Journal of Logistics Management*. v. 17, n. 1, p. 21-37.

Basl, J., (2002). Podnikove informacni systemy, Grada Publishing, Praha. pp. 185.

Ceniga, P., Sukalova, V., (2012). Logistika v manazmente podniku. EDIS, Zilina, pp. 288.

Cornillie, I., Macharis, C., (2005). Driving forces behind the evolution of transport ton kilometres, Proceedings: BIVEC-CIBET Transport research day.

Erhart, Ch., et al., (2010). Delivering tomorrow towards sustainable Logistics. Bonn: Deutsche Post DHL, pp. 156.

Gourdin, K., N., (2006). Global logistics management. Blackwell Publishing, Oxford, pp. 318.

Grant, D., B., et al., (2006). Fundamentals of logistics management. McGraw- Hill education, New York, pp. 436.

Grant, D., B., et al., (2013). Sustaiable Logistics and Supply Chain Management. Kogan Page Ltd., New York pp. 256.

Kille, Ch., Schwemmer, M., (2014). Die TOP 100 der Logistik Erscheinungsjahr, pp.560.

Kliestik, T., (2013). Optimization of transport routes based on graph theory as a part of transport inteligence system. *Transport means, Proceedings of the international science conference 13´*, University of Technology, Kaunas, 308-311.

Lemoine, W., Dagnaes, L., (2003). Globalisation strategies and business organisation of a network of logistics service providers, International Journal of Physical Distribution and Logistics Management, Vol.33, No. 3.

Malindzak, D., Straka, M., Rossova, M.,(2010). Zaklady logistiky podniku, SCL Kosice pp. 286.

Pernica, P., (2004). Logistika (Supply Chain Management) pro 21. stoleti, 1. - 3. dil. Radix, Praha, pp. 785.

Stern, N.,(2007). The Economics of Climate Change. Cambridge University Press, pp. 712.

Stevenson, W., J., (2002). Operations Management, 7th ed., McGraw-Hill/Irwin, NY. pp. 235.